

## Suggesting Structural Enhancements to SNOMED International

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SNOMED International<sup>1</sup> (SNMI) is a comprehensive, coded, and structured system of classification and nomenclature. The third edition of SNMI contains more than 130,000 records, each of which is assigned to one of its eleven modules or "axes." Each term in SNMI is located hierarchically in its assigned axis within a related family of medical terms. SNMI includes cross references within and across axes. These, however, have only been supplied for certain sections, and the relationships between terms are not explicitly labeled.

Some of the relationships proposed had already been designated as cross references in SNMI, but many new ones were discovered as well, and all were given explicit labels. The accompanying table is a sample of a broad range of proposed relationships, both within and across axes, and for diseases and procedures. Overall, approximately 88% of the suggested relationships were accepted. Most formalized relationships will be returned to SNMI for inclusion in future versions of the nomenclature.

Code 1	Term 1	Relationship	Code 2	Term 2
D5-81840	Hepatic amylydosis	Is A	D6-94500	Amyloidosis, NOS
DD-81274	Poisoning by streptomycin	Due To	C-52570	Streptomycin
D3-8135A	Aneurysm of the iliac artery	Has Morphology	M-32200	Aneurysm, NOS
DD-64340	Heat exhaustion due to salt depletion	Has Function	F-01350	Exhaustion, NOS
D-3-8135A	Aneurysm of iliac artery	Affects	T-46700	Iliac artery, NOS
P1-0E322	Epilation by forceps	Surgical Instruments	A-14010	Forceps, NOS
P1-31350	Excision of lesion of myocardium, NOS	Targets	T-32020	Myocardium, NOS
P1-28C20	Pneumonolysis for collapse of lung	Indications	D2-60300	Collapse of lung

Lexical Technology, Inc. (LTI) has been helping to formalize relationships within SNMI. The enhanced version of SNMI will be used to help create comparable patient descriptions at Kaiser Permanente Healthcare. Using lexical programs that exploit substring matching, parsing into phrases separated by particular words (e.g., "due to"), and pattern matching (e.g., identifying words ending in "-oscope" as instruments and matching them to corresponding procedures ending in "-oscopy"), LTI has suggested more than 250,000 within-SNMI relationships. These were then reviewed by subject specialists at Kaiser and the Mayo Clinic. Enhancement efforts focused on the D (Diseases/Diagnoses) and P (Procedures) axes. Approved new relationships were imported into K-Rep, a knowledge representation system developed by IBM,<sup>2</sup> as part of the Galapagos experiment to explore the advantages of computer-based support for the convergence of medical terminologies.<sup>3</sup>

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2. Mays E, Weida R, Dionne R, et al. Scalable and Expressive Medical Terminologies. Proc 1996 Fall AMIA Symposium (to appear).
3. Campbell KE, Cohn SP, Chute CG, et al. Galapagos: Computer-based Support for Evolution of a Convergent Medical Terminology. Proc 1996 AMIA Fall Symposium (to appear).